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ABSTRACT

This document offers instructional materials for a 60-hour course on basic math operations involving decimals, fractions, and proportions as applied in the workplace. The course, part of a workplace literacy project developed by Mercer County Community College (New Jersey) and its partners, contains the following: course outline; 17 lesson objectives pages, each of which is followed by a series of problems to be solved, an answer key, and a quiz; and two pretests and two posttests. The lessons cover the following topics: basic decimal concepts; addition and multiplication of decimals; subtraction and division of decimals; problem-solving with decimals; factoring into prime numbers; basic fraction concepts; multiplication and division of fractions; addition and subtraction of fractions; addition and subtraction of mixed numbers; problem solving with fractions; ratios and rates; solving proportions; decimal/percent/fraction conversions; solving percent problems; percent word problems and shortcuts; percent increase and decrease; and applications of percents. (CML)

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BASIC MATH I

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OVERVIEW OF WORKPLACE LITERACY PROJECT

Skills for Tomorrow, NOW

The Workplace Literacy Project resulted from a Department of Education grant, plus in-kind contributions from a partnership with General Motors Inland Fisher Guide Plant, Princeton Plasma Physics Laboratory, and St. Francis Medical Center. The project is an attempt to find solutions to the growing "skills gap" in industry today. More than 25 million Americans cannot read the front page of a newspaper. In addition, workers whose average ages are rising, must produce in a technological environment that may not have existed when they began working. This lack of knowledge makes it difficult to compete in a technologically changing workplace. Moreover, an increasing number of immigrants have entered the workforce with limited English communication skills. In response to this growing need, the Federal government provided a grant to Mercer County Community College and its partners to develop ways to enrich and expand employees' basic workplace knowledge. The aim of the project was also to improve the self-esteem of the participants.

Support for the project was solicited from all levels of company management and the unions. In addition, an advisory council, comprising key management and employees from each company determined the design, goals, and time-frame of the project. Each company provided a liaison person from their site, and MCCC hired a director to manage the program. Employee release time for classes was site-specific.

Participation in the program was voluntary. Information about classes was disseminated through company letters, flyers, union notices, notices included with paychecks, and open forums with supervisors and employees.

The ABLE test was used for normative pre and post testing. Other types of evaluations varied from course to course. MCCC counselors met with each student to discuss present and future educational objectives.

Courses were offered in reading, business writing, math, science, and English as a Second Language. In addition, there were workshops in problem solving, stress management, and other work survival skills. The curricula for the courses were customized for each worksite to be as job focused as possible.

It is our hope that this program will serve as a model for other organizations to empower their employees with the skills needed to succeed in the changing technological workplace, today and in the future.

COURSE OUTLINE

BASIC MATH I

Course covers basic operations involving decimals, fractions, and proportions. The examples used emphasized applications in the workplace.

OBJECTIVES

Upon completion of this course, students will be able to:

- Perform basic operations involving decimals
- Solve word problems involving decimals
- Perform basic operations involving fractions
- Solve word problems involving fractions
- Perform conversions involving decimals, fractions, and percents
- Calculate percent

TOPICAL OUTLINE

- Basic Decimal Concepts
- Addition and Multiplication of Decimals
- Subtraction and Division of Decimals
- Problem Solving with Decimals
- Factoring into Prime Numbers
- Basic Fraction Concepts
- Multiplication and Division of Fractions
- Addition and Subtraction of Fractions
- Addition and Subtraction of Mixed Numbers
- Problem Solving with Fractions
- Ratios and Rates
- Solving Proportions
- Decimal/Fraction/Percent Conversions
- Solving Percent Problems
- Percent Word Problems and Shortcuts
- Percent Increase and Decrease
- Applications of Percents

OTHER

- 60 hours

SUPPLIES

calculators, metric rulers, Cuisennaire rods

BASIC MATH I

Topic Outline

1. Introduction to Course, Pretest
2. Basic Decimal Concepts
3. Addition and Multiplication of Decimals
4. Subtraction and Division of Decimals
5. Problem Solving with Decimals
6. Factoring into Prime Numbers
7. Basic Fraction Concepts
8. Multiplication and Division of Fractions
9. Addition and Subtraction of Fractions
10. Addition and Subtraction of Mixed Numbers
11. Problem Solving with Fractions
12. Ratios and Rates
13. Solving Proportions
14. Decimal/Fraction/Percent Conversions
15. Solving Percent Problems
16. Percent Word Problems and Shortcuts
17. Percent Increase and Decrease
18. Applications of Percents
19. Post-test, Student/Course Evaluation

BASIC MATH 1

CALCULATOR AGREEMENT

I, _____ am taking temporary posession of a calculator from the GM/MCCC Workplace Literacy Program. I fully understand that I am solely reponsible for the calculator and am expected to return the calculator at the end of this teaching session.

In the event that I do not, for any reason, return the calculator to my instructor at the end of the course, I will give to GM/MCCC Workplace Literacy Program the sum of $6.

Signed,

_____

DECIMALS

BASIC MATH 1

LESSON OBJECTIVES

MODULE: DECIMALS

LESSON: BASIC DECIMAL CONCEPTS

LESSON OBJECTIVES:

Upon completion of this lesson students will be able to:

1. Identify the place and place value, from the millions place down to the thousandths place, of any given digit in a number.

2. Demonstrate an understanding of the concept of place value by:

   a. rewriting a number as the sum of a set of place values.

      EX. 235.8 = 200 + 30 + 5 + 0.8

   b. renaming any place value with a lower equivalent value.

      EX. Given: 235.8

      Question: How many <u>tens</u> are there after the hundreds are converted into tens?

      Answer: 23

3. Read and write whole numbers and decimals.

4. Compare whole numbers and/or decimals (using the symbols <, > or =) and rearrange them in any specified order.

5. Round whole numbers or decimals to a specified place.

BASIC MATH 1

DECIMAL CONCEPTS
LESSON EXAMPLES

Lesson Objective 1:

a. Given: 52.473

Questions: In what place is the 5? What is it's place value?
In what place is the 7? What is it's place value?
In what place is the 2? What is it's place value?

b. Given: 162,574.891

Questions: In what place is the 6? What is it's place value?
In what place is the 1? What is it's place value?
In what place is the 8? What is it's place value?

Lesson Objective 2a:

a. Rewrite 237.56 (as 200 + 30 + 7 + 0.5 + 0.06)

b. Rewrite 1,235,402.6

Lesson Objective 2b:

a. Given: $45.25
Question: How many dimes (tenths) are there if the higher denominations (place values) are changed to dimes?
How many pennies (hundredths) would there be ....?

b. Given: 1,567,182
Question: How many hundreds are there if the higher place values are changed into hundreds?

Lesson Objective 3:

a. Write (say) in word form -- 8,265,102 32,005

b. Write in numerical form -- "fifteen thousand forty-two"

"two hundred one thousand, eight hundred fifty-three"

c. Write (say) in word form -- 0.16 0.404 52.06 12.437

d. Write in numerical form -- "three tenths" "three hundredths"

"twenty-seven thousandths"

"seventy-two and five hundredths"

Lesson Objective 4:

a. Compare (using <, >, =) -- 320518 ? 321699 4351 ? 4325
0.0813 ? 0.0863 0.084 ? 0.091
0.231 ? 0.0231

b. Arrange from smallest to largest: 0.0813, 0.0363, 0.05

Arrange from largest to smallest: 0.0209, 0.27, 0.0259, 0.0283

Lesson Objective 5:

a. Round: 93,542 to the nearest thousand
to the nearest hundred

0.4813 to the nearest tenth
to the nearest whole number

0.3962 to the nearest hundredth
to the nearest thousandth

BASIC MATH 1

PLACE VALUE

1. As you move <u>to the right</u> along a whole number (for example 34,576) do the place values go up or go down?

2. Does the same thing happen when you move <u>to the right</u> along a decimal number (for example 2.391)?

3. In the number 786.095

   a. in what place is the 6? _____

   b. what place value does the 6 have? _____

   c. in what place is the 9? _____

   d. what place value does the 9 have? _____

   e. in what place is the 7? _____

   f. what place value does the 7 have? _____

   g. in what place is the 5? _____

   h. what place value does the 5 have? _____

4. Rewrite the number 746.92 as a sum using the concepts of place value. (for example 42.5 = 40 + 2 + .5)

5. How many $10 bills could I get from $5230?

   (Hint: turn the thousands into hundreds, and then the hundreds into tens)

BASIC MATH 1

READING/WRITING NUMBERS

Rewrite the following numbers from word form into numerical form?

1. nine tenths _____
2. three hundredths _____
3. seventeen thousandths _____
4. five and two tenths _____
5. seventy and forty one hundredths _____
6. two thousand twelve _____

Write each of the following numbers in word form:

7. 0.6 _____
8. 52.06 _____
9. 0.003 _____
10. 1000.01 _____
11. 67.012 _____
12. 125,406 _____

BASIC MATH 1

COMPARE/ORDER NUMBERS

1. Two shipments of identical parts came in on the same afternoon. Ace Trucking sent in 56892 parts and Evans Supply sent in 568920 parts. Which company sent the greatest number of parts?

2. Two machines were being tested to decide which one worked faster. Machine A finished the job in 42.49 seconds and Machine B finished the job in 42.5 seconds. Which machine was faster?

3. A small part is supposed to measure 0.972 inches, but when the computer measured a part Alex was inspecting it was 0.9702 inches. Was Alex's part smaller or larger than it is supposed to be?

4. Darleen used paper and pencil to solve a math problem and her answer was 6.850 but when she used the calculator it said the answer was 6.85. Assuming the calculator's answer was correct, was Darleen's answer right?

5. Mike needs to decide which piece of scrap is larger. One is 1.2999 feet and the other is 1.399 feet. Which one is larger?

6. In 1988 Oldsmobile reported the following car productions -- Firenza: 5230, Calais: 119690, Ciera: 38053, Cutlass Supreme: 140513, Delta 88: 167785, Oldsmobile 98: 76341, Toronado: 15308. Arrange the cars from highest production to lowest production.

7. There were 4 sizes of a tool on a bench and Jake had to put them away in the correct bins. The problem was, the bins were not marked, but, Jake did know that the bins went from smallest to largest. If the sizes of the tools were 0.872, 0.087, 0.8721 and 0.0872, what is the correct arrangement of the tools?

8. Jane needed to send wire through an opening that was 0.8 inches across. There were five pieces of wire (0.79, 0.089, 0.81, 0.80 and 0.9 inches), which pieces would go through?

   (You <u>can</u> fit wire through if it's exactly the same size.)

BASIC MATH 1

ROUNDING NUMBERS

1. Round **6,749** to the nearest hundred. _____

2. Round **54,992** to the nearest ten. _____

3. Round **4.75** to the nearest tenth. _____

4. Round **5.695** to the nearest hundredth. _____

5. Round **86,952** to the nearest thousand. _____

6. Round **7.824** to the nearest tenth. _____

7. Round **924,368** to the nearest ten thousand. _____

8. Round **3.549** to the nearest hundredth. _____

BASIC MATH 1

DECIMAL CONCEPTS
ANSWER KEYS

PLACE VALUE:

1. down 2. yes

3. a. ones b. 6 c. hundredth d. 0.09
e. hundreds f. 700 g. thousandth h. 0.005

4. 746.92 = 700 + 40 + 6 + 0.9 + 0.02

5. 523

READING/WRITING:

1. 0.9 2. 0.03 3. 0.017 4. 5.2
5. 70.41 6. 2012

7. six tenths
8. fifty-two and six hundredths
9. three thousandths
10. one thousand and one hundredth
11. sixty-seven and twelve thousandths
12. one hundred twenty five thousand, four hundred six

COMPARE/ORDER:

1. Evans Supply 2. Machine A 3. smaller 4. yes
5. 1.399
6. Delta 88, Cutlass Supreme, Calais, Oldsmobile 98
Ciera, Toronado, Firenza
7. 0.087, 0.0872, 0.872, 0.8721
8. 0.79, 0.089, 0.80

ROUNDING:

1. 6,700 2. 54,990 3. 4.8 4. 5.70 5. 87,000
6. 7.8 7. 920,000 8. 3.55

BASIC MATH 1

DECIMAL CONCEPTS QUIZ

1. What is the word name for 35.025 ?

2. What is the correct symbol of comparison (<, >, =) for:

   0.0345 ? 0.033999 ?

3. Arrange the following from smallest to largest:

   43.056, 43.005, 43.05, 43.56

4. Round 87,502 to the nearest thousand.

5. Round 5.298 to the nearest hundredth.

BASIC MATH 1

LESSON OBJECTIVES

MODULE: DECIMALS

LESSON: ADDITION & MULTIPLICATION

LESSON OBJECTIVES:

Upon completion of this lesson students will be able to:

1. Add whole numbers and decimals.
2. Demonstrate a physical understanding of addition.
3. Generate addition word problems which use words commonly associated with addition (eg. total, sum, combined, altogether).
4. Demonstrate an understanding of multiplication as repeated addition.
5. Multiply whole numbers and decimals with and without the use of a calculator.
6. Make an estimate of a given product.

BASIC MATH 1

ADDITION & MULTIPLICATION OF DECIMALS
LESSON EXAMPLES

Lesson Objective 1:

a. 2,562 + 50,099 = 32,457 + 2,009,837 =

b. 8.64 + 96.32 + 874.6 = 7.25 + 0.786 + 3 =

Lesson Objective 2:

Use any set of objects. Be sure to emphasize the fact that only like units of measure can be added.

Lesson Objective 3:

This should be student driven. Group activity works well. Encourage them to put together a couple of word problems per group and be prepared to identify any words that are a tip off that this is an addition word problem.

Lesson Objective 4:

The easiest thing to use here is drawings on the board. The students can do this themselves so it's easy to present as, "what does 2 x 3 really mean and when do you use it".

Lesson Objectives 5 & 6:

a. 3 x 7593 = (65)(716) = 423(1509) =

b. estimate the above products.

c. Confirm answers to "a" using a calculator. It may be necessary to demonstrate the key strokes for the calculator using a "mock-up" of their calculator.

d. 120(.01) = 0.19 x 7 (5.7)(0.002)

e. Estimate the above products.
Estimating decimal products usually gives students some difficulty. It is enough if they can understand that, when you multiply a number by a decimal number, the size of this multiplicand will decrease.

EX. When you estimate 12.5 x 0.03, you can say that you expect the answer to be less than 12.5. The students should be able to see that the smaller the decimal multiplier the smaller the result will be.

f. Confirm answers to "d" using calculator.

BASIC MATH 1

ADDITION OF DECIMALS

1. 32.5 + 0.9 + 0.12 = _____

2. 72 + 9.7 + 24 = _____

3. 15.3 + 0.876 + 0.07 = _____

4. 75 + 82.9 + 1.78 = _____

5. 81 + 8.1 + 0.81 = _____

6. 11.7 + 0.078 + 0.24 = _____

7. 42.7 + 8.87 + 0.702 = _____

8. 23 + 17.76 + 9.6 = _____

9. 324.9 + 28 + 14.006 = _____

10. 5.2 + 29.82 + 1.787 = _____

11. 18.33 + 58.7 + 278.04 = _____

12. 0.09 + 5.027 + 23.784 = _____

13. 65.87 + 307 + 19.9 = _____

14. 5.005 + 14 + 129.6 = _____

15. 107.2 + 0.782 + 39.4 = _____

16. 71.9 + 0.62 + 127.8 = _____

BASIC MATH 1

MULTIPLICATION OF DECIMALS

1. 34 x 2 =

2. 512(2) =

3. 61,001 x 8 =

4. $\begin{array}{r} 573 \\ \times\ 285 \\ \hline \end{array}$

5. $\begin{array}{r} 56 \\ \times\ 4 \\ \hline \end{array}$

6. $\begin{array}{r} 870 \\ \times\ 4 \\ \hline \end{array}$

7. $\begin{array}{r} 7182 \\ \times\ 3 \\ \hline \end{array}$

8. $\begin{array}{r} 398 \\ \times\ 75 \\ \hline \end{array}$

9. $\begin{array}{r} 4068 \\ \times\ 96 \\ \hline \end{array}$

10. (8)(9700) =

11. 2.3 x 4 =

12. (0.2)(74) =

13. (3.02)(41) =

14. (0.93)(0.69) =

15. 0.06 x 0.05 =

16. (0.005)(0.083) =

17. 5.7(0.002) =

18. 0.87 x 6.9 =

19. 0.009 x 1000 =

20. 1000(490) =

21. 6.5 x 10000 =

22. $20.05 x 25.4 =

23. $306.50 x 3 =

24. $3.50 x 40 =

25. $4.25 x 100 =

BASIC MATH 1

ADDITION & MULTIPLICATION OF DECIMALS
ANSWER KEY

ADDITION:

1. 33.52	2. 105.7	3. 16.246	4. 159.68
5. 89.91	6. 12.018	7. 52.272	8. 50.36
9. 366.906	10. 36.807	11. 355.07	12. 28.901
13. 392.77	14. 148.605	15. 147.382	16. 200.32

MULTIPLICATION:

1. 68	2. 1,024	3. 488,008	4. 163,305
5. 224	6. 3,480	7. 21,546	8. 29,850
9. 390,528	10. 77,600	11. 9.2	12. 14.8
13. 123.82	14. 0.6417	15. 0.003	16. 0.000415
17. 0.0114	18. 6.003	19. 9	20. 490,000
21. 65,000	22. $509.27	23. $919.50	24. $140.00
25. $425.00			

BASIC MATH 1

ADDITION & MULTIPLICATION OF DECIMALS
QUIZ

1. 32.48 + 9.025 =

2. 25 + 0.45 + 0.019 =

3. 2.5 x 0.5 =

4. 10.5 x 8.02 =

5. Write a word problem which uses the operation of additon.

BASIC MATH 1

LESSON OBJECTIVES

MODULE: DECIMALS

LESSON: SUBTRACTION & DIVISION

LESSON OBJECTIVES:

Upon completion of this lesson students will be able to:

1. Subtract whole numbers and decimals.
2. Demostrate a physical understanding of subtraction as the "take away" operation.
3. Demonstrate a physical understanding of regrouping
4. Generate subtraction word problems which use words commonly associated with subtraction (eg. remains, left, leftover, more than, less than).
5. Divide whole numbers, expressing the quotient in remainder form.
6. Divide whole numbers and decimals with and without the use of a calculator.
7. Demonstrate an understanding of division as repeated subtraction.
8. Understand the two uses for divison (ie. to divide a quantity into a given number of equal pieces OR to divide a quantity into pieces of a given size).

   EX. $10 \div 2 = 5$

   Interpretation 1: Ten things divided evenly into 2 piles. Each pile then contains 5 things.

   Interpretation 2: Ten things divided into piles each containing 2 things. There are then 5 small piles.

9. Multiply or divide by powers of 10 (10, 100, 1000, etc.) without the use of a calculator.

BASIC MATH 1

LESSON EXAMPLES
SUBTRACTION & DIVISION OF DECIMALS

Lesson Objective 1:

a. 19,848 - 7,126 = 250,045 - 129,789 =

b. 0.99 - 0.27 = 6.32 - 6.09 = 246.435 - 178.57 =

Lesson Objective 2:

Use any set of objects. Be sure to emphasize the fact that only like units of measure can be subtracted.

Lesson Objective 3:

Use of play money is very helpful.

Lesson Objective 4:

This activity should be student driven (similar in format to the approach to addition word problems).

Lesson Objective 5:

Division with remainders -- 94 ÷ 8 = 3158 / 2 =
1601 / 20 = 17,480 ÷ 70

Lesson Objective 6:

The practice work should also be attempted without the use of a calculator.

a. 125 ÷ 20 = 255 / 15 = 7/8 = 122 ÷ 9 =

b. 1.47 ÷ 7 = 7/8 = 0.15 / 0.3 = 3.69 ÷ 2.05

Lesson Objectives 7 & 8:

Use any set of objects sufficiently large (at least 12 objects are needed).

It is generally easier when illustrating division into a specified number of groups, to use 2 or 3 as the divisor.

Lesson Objective 9:

Illustrate this by having the students calculate the following series (preferably exactly as shown):

12.5 x 10	12.5 x 100	12.5 x 1,000	12.5 x 10,000
12.5 ÷ 10	12.5 ÷ 100	12.5 ÷ 1,000	12.5 x 10,000

Students MUST become accustomed to doing this without either pencil and paper or a calculator!

BASIC MATH 1

SUBTRACTION OF DECIMALS

1. 4.7 - 3 = _____

2. 9 - 8.7 = _____

3. 7.01 - 0.2 = _____

4. 6.87 - 5.9 = _____

5. 23.6 - 15.87 = _____

6. 9 - 9.0 = _____

7. 27.56 - 11.2 = _____

8. 30.9 - 29.99 = _____

9. 23.72 - 10.842 = _____

10. 93.1 - 74.076 = _____

11. 3.6 - 0.05 = _____

12. 2.2 - 0.7642 = _____

13. 427.62 - 374.9 = _____

14. 0.1028 - 0.04 = _____

15. 127 - 0.172 = _____

16. 0.386 - 0.2976 = _____

BASIC MATH 1

DIVISION OF DECIMALS

Write the following quotients in REMAINDER form:

1. 228 ÷ 4 = _____ 2. 11500 / 225 = _____ 3. 1580 ÷ 78 = _____

Find the EXACT quotient (decimal form) for each of the following:

(Be sure to attempt each of these with paper and pencil <u>before</u> using your calculator.)

4. 6030 ÷ 0.9 = _____ 5. divide 0.27 by 3 = _____

6. 0.24 / 0.4 = _____ 7. divide 2.344 by 5.86 = _____

8. 36 divided into 513 = _____ 9. 17.1 / 38 = _____

10. 148 ÷ 0.037 = _____ 11. 154.2 / 0.6 = _____

12. 0.045 / 0.75 = _____ 13. 57.646 ÷ 8.2 = _____

ROUND the quotients of the following to the nearest <u>hundredth</u>:

14. 760 ÷ 6.09 ≈ _____ 15. 0.748 ÷ 4 ≈ _____

16. 0.4325 / 0.016 ≈ _____ 17. 239.65 / 45 ≈ _____

Find the exact quotients <u>without using your calculator</u>:

18. 668,000 / 10,000 = _____ 19. 3.52 ÷ 1000 = _____

20. 0.6 ÷ 100 = _____ 21. 0.048 / 100 = _____

BASIC MATH 1

SUBTRACTION & DIVISION OF DECIMALS
ANSWER KEYS

SUBTRACTION:	1. 1.7	2. 0.3	3. 6.81	4. 0.97
	5. 7.73	6. 0	7. 16.36	8. 0.91
	9. 12.878	10. 19.024	11. 3.55	12. 1.4358
	13. 52.72	14. 0.0628	15. 126.828	16. 0.0884

DIVISION:	1. 57 R0	2. 51 R25	3. 20 R20	4. 6700
	5. 0.09	6. 0.6	7. 0.4	8. 14.25
	9. 0.45	10. 4,000	11. 257	12. 0.06
	13. 7.03	14. 124.79	15. 0.19	16. 27.03
	17. 5.33	18. 66.8	19. 0.00352	20. 0.006
	21. 0.00048			

BASIC MATH 1

SUBTRACTION & DIVISION OF DECIMALS
QUIZ

1. 60 - 0.45 =

2. 7.02 - 0.099 =

3. Write a word problem that requires subtraction.

4. Divide using remainders: 125 ÷ 10.

5. 30 / 12 =

6. 90 ÷ 0.3 =

BASIC MATH 1

LESSON OBJECTIVES

MODULE: DECIMALS

LESSON: PROBLEM SOLVING

LESSON OBJECTIVES:

Upon completion of this lesson students will be able to:

1. Identify single-step word problems, identify the correct operation and perform the calculation in the proper sequence.

2. Identify multi-step word problems, identify the correct operations and perform the calculations in the proper sequence.

   These problems should be attempted in groups with emphasis placed not only on the group arriving at the correct answer but being able to articulate their reasoning and the sequence used.

3. Identify some commonly used words that sometimes help in determining the appropriate operation. It should be made clear that these terms DO NOT always indicate only one operation.

BASIC MATH 1

PROBLEM SOLVING WITH DECIMALS

1. The cost to the company of four parts of a car door were $10, $125.50, $5.12 and $20.06. What was the total cost of the parts?

2. Employee attendence for two shifts was 2,281 and 1,997. What was the combined employee attendence for the two shifts?

3. A gasket was reduced in size from 0.9 inches in width to 0.79 inches in width. What was the amount of the reduction?

4. A truck will hold up to 500 pounds of scrap. If you have already put in 290.8 pounds, how many more pounds will the truck hold?

5. A machine is able to cycle 280 widgets per hour. How many widgets can the machine process in 8 hours (assuming it runs continuously)?

6. When Paula checked her inventory of rivets she had on hand three boxes each containing 50 rivets and one open box that contained about 35 rivets. About how many rivets altogether did Paula have?

7. If a machine makes 486 parts in 9 hours, how many parts does the machine make in 1 hour?

8. If a worker packs 1.8 boxes per minute, how many minutes will it take him to pack 117 boxes?

9. When Marc got his paycheck he noticed that he had earned $680 in regular pay and $204 in overtime pay. The state took out $17.68, the federal government took out $212.16 and union dues are $5. What will Marc's take-home pay be?

10. Sam was in charge of keeping track of the glove inventory for his shift. When he got there Friday morning there were 165 pairs on hand. Before lunch, 24 pairs were taken out and 17 pairs were returned. After lunch, 15 pairs were taken out and 36 pairs were returned. What was the number of gloves in inventory when Sam filled out his log book at the end of his shift?

11. What is a worker's average rate in pieces per hour, if in the first hour he packed three full cartons (a full carton contains 15 pieces), and in the second hour he packed two full cartons and a third carton containing only 12 pieces?

12. If a worker can install 15 door handles in 30 minutes, how many door handles can he or she install in 70 minutes?

FRACTIONS

BASIC MATH 1

LESSON OBJECTIVES

MODULE: FRACTIONS

LESSON: FACTORING INTO PRIMES

LESSON OBJECTIVES:

Upon completion of this lesson students will be able to:

1. Define a factor and be able to find all the factors of a given number.

2. Define a prime factor and list the prime factors less than 20.

3. Factor a given composite numbers into a product of primes.

4. Define and find (using prime factors) the least common multiple of a set of numbers.

BASIC MATH 1

LESSON EXAMPLES
FACTORING INTO PRIMES

Lesson Objective 1:

The best numbers to use here are less than 50.

Lesson Objective 2:

(no notes needed)

Lesson Objective 3:

The best numbers to use here are less than 200.

Lesson Objective 4:

a. 3 and 4 | 12 and 21 | 4, 10 and 6 | 16, 32 and 8
8 and 10 | 5, 3 and 6

BASIC MATH 1

FACTORING INTO PRIMES & LCM

Find all the factors of each of the following:

1. 12 2. 40 3. 50

Factor each of the following into a product of primes:

4. 20 5. 60 6. 48

7. 14 8. 27 9. 75

10. 84 11. 144 12. 70

Find the LCM (least common multiple) of each of the following:

13. 4 and 6 14. 9 and 3 15. 5 and 9

16. 10 and 15 17. 16 and 24 18. 12 and 15

19. 12 and 20 20. 5 and 15

BASIC MATH 1

FACTORING INTO PRIMES & LCM
ANSWER KEY

1. 1, 2, 3, 4, 6, 12

2. 1, 2, 4, 5, 8, 10, 20, 40

3. 1, 2, 5, 10, 25, 50

4. $20 = 2 \times 2 \times 5$

5. $60 = 2 \times 2 \times 3 \times 5$

6. $48 = 2 \times 2 \times 2 \times 2 \times 3$

7. $14 = 2 \times 7$

8. $27 = 3 \times 3 \times 3$

9. $75 = 3 \times 5 \times 5$

10. $84 = 2 \times 2 \times 3 \times 7$

11. $144 = 2 \times 2 \times 2 \times 2 \times 3 \times 3$

12. $70 = 2 \times 5 \times 7$

13. 12 14. 9 15. 45 16. 30 17. 48 18. 60

19. 60 20. 15

BASIC MATH 1

FACTORING INTO PRIMES & LCD
QUIZ

1. List all the factors of 24.

For Questions 2 & 3: Factor into a product of primes.

2. 36 =

3. 80

For Questions 4 & 5: Find the LCM of the numbers given.

4. 4, 5, 15

5. 12, 6, 16

BASIC MATH 1

LESSON OBJECTIVES

MODULE: FRACTIONS

LESSON: FRACTION BASICS - I

LESSON OBJECTIVES:

Upon completion of this lesson students will be able to:

1. Physically represent a fraction using common materials and drawings.
2. Identify the parts of a fraction by name and meaning.
3. Demonstrate, when given a manipulative, an understanding of equality of fractions (representing equal parts of a whole).
4. Change fractions into division problems and convert them into their decimal representation.
5. Define repeating decimals and write them using repeat bar notation.
6. Convert a decimal number into its fractional notation.
7. Compare fractions using comparison of the cross products.

BASIC MATH 1

LESSON EXAMPLES
FRACTION BASICS - I

Lesson Objective 1:

Use the cuisinaire rods for this. This activity works best if you get the students to construct rod trains of the factors of a longer train. (You may want to create a train by joining several color rods together.)

The students must be able to understand that the denominator of the fraction represents the number of parts that make up the whole (for example the number of red rods it takes to make a 24 train).

If you do not have the cuisinaire rods, you can use the cardboard base of a soda carton, or a dollar bill, or boxes of differently sized or colored screws or bolts.

Have the students suggest applications of fractions and their meanings.

Lesson Objective 2:

No examples needed.

Lesson Objective 3:

Use the same materials as above, focusing on drawing equal fractions. Pairs of students should be able to come up with some of their own equal fractions. This activity works well with cuisinaire rods but is somewhat time consuming until you let the students know what you want them to do.

Be sure to include the conversion of whole numbers into fractions.

EX. Using 2 case bottoms you can show that 1/2 represents the same part of the cardboard as 6/12.

You can then ask the students to come up with equivalent fraction(s) to one you select (give each group a different fraction). They will then have to present their answers to the class.

Lesson Objective 4:

Show them that to take 1/2 of paper you divide it in half.

Show them computationally how to rewrite all fractions as division problem. Three-fourths works well here because many of them know that 3/4 is 0.75 (tell the ones who are stuck to thing "3/4 of a dollar is $0.75").

Allow them to use the calculator for their conversions.

Lesson Objective 5:

They should become familiar with 1/3 = 0.333... and 2/3 = 0.666...

You will need to show them how to recognize repeating decimals on their calculators.

Lesson Objective 6:

Remind student about place values. Use simple decimals that do not go past the thousandth place.

(Note: they do not know how to reduce to lower terms yet)

Lesson Objective 7:

5/8 & 2/3 8/9 & 7/8 3/7 & 5/11

BASIC MATH 1

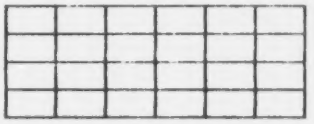
FRACTION BASICS

1. Write the correct fraction for three eighths. _____

2. Write the correct fraction for six hundredths _____

Write the fraction represented by the shaded part of each figure:

3. = _____

4.  = _____

5. Draw a figure that represents 7/10.

6. A box contains 150 screws. Some are wood screws and others are metal screws. There are 85 wood screws.

   a. What fraction of the box is wood screws? _____

   b. What fraction of the box is sheet metal screws? _____

7. A work group consists of 2/3 men.

   What fraction of the group is women? _____

8. Twenty-one of 25 parts have zero defects.

   a. What fraction of the parts have zero defects? _____

   b. What fraction of the parts do not have zero defects? _____

BASIC MATH 1

FRACTION / DECIMAL CONVERSIONS

Convert the following fractions into decimals:

1. 3/4 = _____ 2. 1/2 = _____ 3. 1/8 = _____

4. 2/3 = _____ 5. 3/5 = _____ 6. 7/12 = _____

7. 1/6 = _____ 8. 2/10 = _____ 9. 3/8 = _____

10. 1/3 = _____ 11. 4/5 = _____ 12. 7/10 = _____

Convert the following decimals into fractions:

13. 0.7 = _____ 14. $0.\overline{6}$ = _____ 15. 0.02 = _____

16. 0.25 = _____ 17. 0.004 = _____ 18. 0.6 = _____

19. 0.5 = _____ 20. 0.3 = _____ 21. $0.\overline{3}$ = _____

22. 0.75 = _____ 23. 0.125 = _____ 24. 0.875 = _____

BASIC MATH 1

COMPARISON OF FRACTIONS

Compare the following fractions using <, > or =

1. 5/8 _____ 2/3

2. 8/9 _____ 7/8

3. 9/12 _____ 6/8

4. 7/1 _____ 16/2

5. 5/10 _____ 25/50

6. 7/5 _____ 11/8

7. 8/15 _____ 3/5

8. 23/23 _____ 17/17

9. 7/11 _____ 11/7

10. 13/25 _____ 11/19

BASIC MATH 1

IMPROPER FRACTIONS & MIXED NUMBERS

For each of the following drawings indicate the improper fraction and mixed number represented:

1.

improper fraction _____

mixed number _____

2.

improper fraction _____

mixed number _____

Convert the following improper fractions into mixed numbers (or whole numbers):

3. 11/4 = _____ 4. 9/8 = _____ 5. 48/16 = _____

6. 17/8 = _____ 7. 7/3 = _____ 8. 9/9 = _____

9. 16/3 = _____ 10. 9/5 = _____ 11. 12/5 = _____

12. 73/6 = _____

Convert the following mixed numbers to improper fractions:

13. 3 1/3 = _____ 14. 4 2/3 = _____ 15. 3 3/8 = _____

16. 8 5/6 = _____ 17. 3 7/9 = _____ 18. 5 3/11 = _____

19. 5 3/7 = _____ 20. 1 5/8 = _____ 21. 9 1/4 = _____

22. 3 5/12 = _____

BASIC MATH 1

SIMPLIFYING FRACTIONS & MIXED NUMBERS

Rewrite each of the following fractions in lowest terms:

1. 25/35 = _____ 2. 12/144 = _____ 3. 16/28 = _____

4. 40/100 = _____ 5. 15/30 = _____ 6. 27/36 = _____

7. 16/32 = _____ 8. 14/35 = _____ 9. 45/50 = _____

10. 26/30 = _____ 11. 70/150 = _____ 12. 15/36 = _____

Rewrite each of the following mixed numbers in simplest form:

13. 5 11/4 = _____ 14. 25 29/5 = _____ 15. 11 19/3 = _____

16. 3 14/6 = _____ 17. 5 11/2 = _____ 18. 17 28/20 = _____

19. 14 39/6 = _____ 20. 15 20/6 = _____ 21. 14 28/7 = _____

22. 15 21/14 = _____ 23. 2 29/4 = _____ 24. 7 9/8 = _____

BASIC MATH 1

LESSON OBJECTIVES

MODULE: FRACTIONS

LESSON: FRACTION BASICS - II

LESSON OBJECTIVES:

Upon completion of this lesson students will be able to:

1. Define and construct a physical represenation of an improper fraction (vs. a proper fraction).
2. Construct a physical representaion of a whole number or mixed number and determine the correct whole number or mixed number when given a physical representation.
3. Convert a mixed number into an improper fraction using computational methods.
4. Convert an improper fraction into a mixed number using computational methods.
5. Reduce fractions to lowest terms and simplify mixed number.
6. Compare mixed numbers using the symbols <, > or =.

BASIC MATH 1

LESSON EXAMPLES
FRACTION BASICS - II

Lesson Objective 1:

Use diagrams here. Emphasize the contrast between an improper fraction and a proper fraction.

3/2 9/4 11/3 23/5

4/1 8/2 2/1 8/4 6/2 3/1

Lesson Objective 2:

Use same diagrams used for Objective 1.

Students may have some difficulty expressing the whole numbers as a fraction. Be sure to draw the whole number diagrams without any partitions so the concept of using a denominator of 1 is more easily seen.

1 1/2 2 1/4 3 2/3 4 3/5 4 2 3

Lesson Objective 3:

Use the mixed numbers and whole numbers from Objective 2 (which are matched to the improper fractions in Objective 1).

Lesson Objective 4:

Use the improper fractions from Objective 1 (which are matched to the mixed numbers and whole numbers in Objective 2).

Lesson Objective 5:

25/35 16/32 12/36 21/49

7 21/18 15 20/6 3 14/6 11 19/3

(Be sure to emphasize, with drawings if necessary, the relationship to equal fractions).

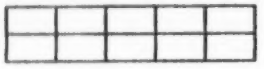
Lesson Objective 6:

2 3/2 & 3 6/5 & 1 1/5 5 1/4 & 4 10/8 2 2/3 & 2 3/5

BASIC MATH 1

FRACTION BASICS & FRACTION / DECIMAL CONVERSIONS
ANSWER KEY

FRACTION BASICS: 1. 3/8 2. 6/100 3. 5/12 4. 11/24

5. 

6. a. 85/150 b. 65/150 7. 1/3
8. a. 21/25 b. 4/25

FRACTION/DECIMAL CONVERSIONS:

1. 0.75	2. 0.5	3. 0.125
4. 0.6_	5. 0.6	6. 0.583
7. 0.16	8. 0.2	9. 0.375
10. 0.3	11. 0.8	12. 0.7
13. 7/10	14. 2/3	15. 2/100
16. 25/100	17. 4/1000	18. 6/10
19. 5/10	20. 3/10	21. 1/3
22. 75/100	23. 125/1000	24. 875/1000

COMPARISON OF FRACTIONS: 1. < 2. > 3. = 4. < 5. =
6. > 7. < 8. = 9. < 10. <

BASIC MATH 1

BASIC FRACTION CONCEPTS - I
QUIZ

1. Draw a figure that represents 3/5.

2. A basket contains 75 parts. What fraction of the parts are defective if 13 parts are defective?

3. Convert 7/8 into a decimal.

For questions 4 & 5: Convert each of the following to fractions.

4. 0.085 =

5. $0.\overline{6}$ =

6. Compare 3/5 & 8/11 using <, > or =.

BASIC MATH 1

COMPARISON OF MIXED NUMBERS

Compare the following fractions & mixed number pairs (use <, > or =)

1. 2 3/2 _____ 3

2. 2 1/4 _____ 1 5/4

3. 5 _____ 4 8/3

4. 3 2/3 _____ 11/3

5. 13/4 _____ 2 3/4

6. 6 7/8 _____ 6 3/4

7. 8 _____ 7 8/8

8. 4 4/7 _____ 4 3/5

BASIC MATH 1

FRACTION BASICS – II

ANSWER KEYS

IMPROPER FRACTIONS & MIXED NUMBERS:

1. 13/4, 3 1/4 2. 19/5, 3 4/5

3. 2 3/4 4. 1 1/8 5. 3
6. 2 1/8 7. 2 1/3 8. 1
9. 5 1/3 10. 1 4/5 11. 2 2/5
12. 12 1/6

13. 10/3 14. 14/3 15. 27/8
16. 53/6 17. 34/9 18. 58/11
19. 38/7 20. 13/8 21. 37/4
22. 41/12

SIMPLIFYING FRACTIONS & MIXED NUMBERS:

1. 5/7 2. 1/12 3. 4/7
4. 2/5 5. 1/2 6. 3/4
7. 1/2 8. 2/5 9. 9/10
10. 13/15 11. 7/15 12. 5/12

13. 7 3/4 14. 30 4/5 15. 17 1/3
16. 5 1/3 17. 10 1/2 18. 18 2/5
19. 20 1/2 20. 18 1/3 21. 18
22. 16 1/2 23. 9 1/4 24. 8 1/8

COMPARISONS OF FRACTIONS & MIXED NUMBERS:

1. > 2. = 3. < 4. = 5. > 6. >

7. = 8. <

BASIC MATH 1

FRACTION BASICS - II

QUIZ

1. Convert 17/12 into a mixed number.

2. Rewrite 8 as a fraction.

3. Convert 4 5/8 into an improper fraction.

For Questions 4 & 5: Simplify.

4. 15/20 =

5. 6 45/10 =

6. Compare (<, >, =) 2 7/8 ? 2 9/11

BASIC MATH 1

LESSON OBJECTIVES

MODULE: FRACTIONS

LESSON: MULTIPLICATION & DIVISION

LESSON OBJECTIVES:

Upon completion students will be able to:

1. Multiply with fractions, mixed numbers and/or whole numbers.
2. Divide with fractions, mixed numbers and/or whole numbers.
3. Identify as needing multiplication, word problems in a similar form as "what is 2/3 of 150".

BASIC MATH 1

LESSON EXAMPLES
MULTIPLICATION & DIVISION OF FRACTIONS

Lesson Objective 1:

3/4 • 5/6 2/5 x 1/3 x 1/4 2/7 • 1/3 • 7/10

(12)1/6 2 2/3 x 1 1/6 1 1/6 x 1 1/2

Lesson Objective 2:

3/4 ÷ 1/3 9/25 ÷ 15/35 9 ÷ 1/3 3 ÷ 5/6

2 1/2 ÷ 1 3/5 1 3/8 ÷ 2

Lesson Objective 3:

The focus of this activity should be to help students realize that fractional relationships such as the one expressed in "2/3 of 150" is essentially the same relationship in the expression "3 times 150". In both cases the number 150 is being adjusted (using multiplication); in the case of "2/3 of 150", 150 is being adjusted down in size; in the case of "3 times 150", 150 is being adjusted up in size.

What is 1/2 of 20? What is 2/3 of 60?

What is 1/3 of 5/6? What is 5/8 of 1/10?

What is 4/5 of 120? What is 7/10 of 60?

BASIC MATH 1

MULTIPLICATION OF FRACTIONS

1. $\frac{5}{6} \times \frac{6}{25} =$ _____

2. $\frac{4}{12} \times \frac{3}{8} =$ _____

3. $\frac{42}{17} \times \frac{34}{49} =$ _____

4. $\frac{16}{27} \times \frac{18}{32} =$ _____

5. $\frac{13}{48} \times \frac{16}{39} =$ _____

6. $\frac{4}{5} \times \frac{15}{24} \times \frac{3}{12} =$ _____

7. $\frac{3}{10} \times \frac{2}{3} \times \frac{1}{5} =$ _____

8. $\frac{14}{4} \times \frac{4}{7} \times \frac{1}{2} =$ _____

9. $3\ \frac{5}{6} \times 2\ \frac{5}{8} =$ _____

10. $7\ \frac{1}{2} \times 2\ \frac{1}{10} =$ _____

11. $3\ \frac{4}{7} \times 1\ \frac{2}{5} =$ _____

12. $7\ \frac{7}{8} \times 3 \times 2\ \frac{8}{9} =$ _____

13. $2 \times 6\ \frac{2}{5} \times 6\ \frac{3}{8} =$ _____

14. $4\ \frac{1}{5} \times \frac{2}{3} \times 4 =$ _____

BASIC MATH 1

DIVISION OF FRACTIONS

1. $\frac{9}{15} \div 3 =$ _____

2. $\frac{9}{20} \div \frac{6}{35} =$ _____

3. $\frac{16}{25} \div \frac{20}{75} =$ _____

4. $\frac{4}{5} \div 8 =$ _____

5. $\frac{20}{21} \div \frac{25}{36} =$ _____

6. $9\frac{2}{3} \div \frac{1}{3} =$ _____

7. $1\frac{2}{3} \div 4\frac{1}{6} =$ _____

8. $9\frac{3}{4} \div 13 =$ _____

9. $3\frac{1}{3} \div 2\frac{2}{15} =$ _____

10. $16\frac{2}{3} \div 4\frac{1}{6} =$ _____

11. $8\frac{1}{3} \div 6 =$ _____

12. $4\frac{1}{6} \div 1\frac{2}{3} =$ _____

BASIC MATH 1

FRACTION MULTIPLICATION WORD PROBLEMS

1. What is 1/20 of 3000? _____

2. What is 2/3 of 3/4? _____

3. What is 5/8 of 45? _____

4. What is 1/2 of 3/4? _____

5. What is 3/4 of 36? _____

BASIC MATH 1

MULTIPLICATION & DIVISION OF FRACTIONS
ANSWER KEYS

MULTIPLICATION:

1. 1/5	2. 1/8	3. 1 5/7	4. 1/3
5. 1/9	6. 1/8	7. 1/25	8. 1
9. 10 1/16	10. 15 3/4	11. 5	12. 68 1/4
13. 81 3/5	14. 11 1/5		

DIVISION:

1. 1/5	2. 2 5/8	3. 2 2/5	4. 1/10
5. 1 13/35	6. 29	7. 2/5	8. 3/4
9. 1 9/16	10. 4	11. 1 7/18	12. 2 1/2

WORD PROBLEMS:

1. 150	2. 1/2	3. 28 1/8	4. 3/8
5. 27			

BASIC MATH 1

MULTIPLICATION & DIVISION OF FRACTIONS
QUIZ

1. 2/3 • 15/16 =

2. 3 3/5 • 1 1/24 =

3. 8/15 ÷ 12/21

4. 1 4/5 ÷ 2 7/10 =

5. What is 3/4 of 200?

BASIC MATH 1

LESSON OBJECTIVES

MODULE: FRACTIONS

LESSON: ADDITION & SUBTRACTION

LESSON OBJECTIVES:

Upon completion of this lesson students will be able to:

1. Add and subtract like fractions.
2. Raise fractions to higher terms (specifically the LCD).
3. Add and subtract unlike fractions.
4. Subtract proper fractions from 1.

BASIC MATH 1

LESSON EXAMPLES
ADDITION & SUBTRACTION OF FRACTIONS

Lesson Example 1:

6/7 + 5/7 + 3/7 7/10 + 1/10 + 3/10 + 9/10

11/3 - 2/3 6/7 - 2/7

Lesson Example 2:

1/6 = ?/18 3/25 = ?/100 3/5 = ?/20

5/6 = ?/24 3/4 = ?/60

Lesson Objective 3:

You will need to define the LCD as the LCM of the denominators and remind them about how to find the LCM (emphasis should be placed on the definition as the smallest number that all the denominators divide evenly into).

1/4 + 3/5 1/8 + 5/6 3/4 + 1/3 + 4/5

2/3 - 1/2 7/8 - 1/10

Lesson Objective 4:

1 - 4/5 1 - 9/10 1 - 3/4 1 - 7/12 1 - 8/15

If 3/10 of your department's budget is spent on salaries, what fraction is not spent on salaries?

Your job for the day consists of work with door handles and work with seat adjusters. If you spent 3/8 of your time on seat adjusters, what part of your time was spent working on door handles?

What part of your pay do you take home if 2/5 of your pay is taken out in taxes and other automatic deductions.

A chart showed that 1/3 of a department's time was spent on putting parts together, 1/6 of their time was spent on inspection of parts and 1/8 of their time was spent in meetings. What fraction of the department's time was spent on other activities.

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BASIC MATH 1

ADDITION & SUBTRACTION OF FRACTIONS

1. $\frac{1}{5} + \frac{2}{5} =$ _____

2. $\frac{1}{6} + \frac{8}{6} =$ _____

3. $\frac{9}{10} + \frac{9}{10} =$ _____

4. $\frac{1}{2} + \frac{1}{5} =$ _____

5. $\frac{4}{5} + \frac{1}{10} =$ _____

6. $\frac{1}{6} + \frac{3}{4} =$ _____

7. $\frac{4}{5} - \frac{1}{8} =$ _____

8. $\frac{3}{5} - \frac{7}{15} =$ _____

9. $\frac{4}{9} - \frac{1}{3} =$ _____

10. $\frac{5}{12} - \frac{3}{8} =$ _____

11. $\frac{5}{6} - \frac{2}{5} =$ _____

12. $\frac{3}{8} + \frac{5}{6} =$ _____

13. $\frac{5}{7} + \frac{9}{7} - \frac{6}{7} =$ _____

14. $\frac{1}{5} + \frac{7}{10} - \frac{4}{15} =$ _____

BASIC MATH 1

SUBTRACTION OF FRACTIONS FROM 1

1. 1 - 4/5 = _____

2. 1 - 5/8 = _____

3. 1 - 6/7 = _____

4. 1 - 7/12 = _____

5. If Tim has used 3/5 of his parts, what fraction is left?

6. A department has completed 1/4 of its work quota for the day. What part of the quota still remains?

7. If 5/16 of a company's budget is spent on advertising and marketing, what part of the budget is not spent on advertising and marketing?

8. Three employees chip in to buy a lottery ticket. Alan puts in 1/5 of the money and Jamie puts in 3/8. What fraction of the money did Brian put in?

BASIC MATH 1

ADDITION & SUBTRACTION OF FRACTIONS
ANSWER KEYS

ADDITION & SUBTRACTION:

1. 3/5	2. 1 1/2	3. 1 4/5
4. 7/10	5. 9/10	6. 11/12
7. 27/40	8. 2/15	9. 1/9
10. 1/24	11. 13/30	12. 1 5/24
13. 1 1/7	14. 19/30	

SUBTRACTION FROM 1:

1. 1/5	2. 3/8	3. 1/7	4. 5/12
5. 2/5	6. 3/4	7. 11/16	8. 17/40

BASIC MATH 1

ADDITION & SUBTRACTION OF FRACTIONS
QUIZ

1. 7/12 + 11/12 =

2. 5/32 - 3/32 =

3. 1/6 + 3/8 =

4. 2/3 - 2/5 =

5. 1 - 17/20 =

BASIC MATH 1

LESSON OBJECTIVES

MODULE: FRACTIONS

LESSON: ADDITION & SUBTRACTION OF MIXED NUMBERS

LESSON OBJECTIVES:

Upon completion of this lesson students will be able to:

1. Add mixed numbers using the method of adding the fractions then adding the whole numbers and then simplifying the result.

2. Subtract (without regrouping) mixed numbers using the method of subtracting the fractions and then subtracting the whole numbers.

3. Subtract (with regrouping) mixed numbers using the method of regrouping from the whole number to give to the fraction and then subtracting the fractions and subtracting the whole numbers

BASIC MATH 1

LESSON EXAMPLES
ADDITION & SUBTRACTION OF MIXED NUMBERS

Lesson Example 1:

7 3/8 + 5 1/2 + 4 1/3 4 2/3 + 2 3/4

2 5/6 + 5 3/4

Lesson Example 2:

7 4/5- 6 7 1/2 - 1/3 3 5/8 - 1 1/12

Lesson Objective 3:

2 1/8 - 1 3/8 5 1/3 - 4 3/4 1 3/4 - 5/6

3 - 2 3/4 4 - 3/16

BASIC MATH 1

ADDITION OF MIXED NUMBERS

1. $5\frac{2}{9} + \frac{4}{9} =$ _____

2. $5 + \frac{1}{10} =$ _____

3. $\frac{3}{8} + 4 =$ _____

4. $8\frac{1}{3} + 3\frac{4}{5} =$ _____

5. $3\frac{1}{5} + 2\frac{1}{2} + 5\frac{1}{4} =$ _____

6. $3\frac{1}{3} + \frac{7}{15} + 1\frac{1}{5} =$ _____

7. $2\frac{1}{4} + 3\frac{5}{8} + 1\frac{1}{6} =$ _____

8. $2\frac{1}{2} + 1\frac{3}{4} + 2\frac{3}{8} =$ _____

BASIC MATH 1

SUBTRACTION OF MIXED NUMBERS

1. $8\ \frac{7}{10} - 3\ \frac{3}{8} =$ _____

2. $3\ \frac{2}{3} - 2\ \frac{1}{4} =$ _____

3. $3\ \frac{1}{4} - 2 =$ _____

4. $2\ \frac{2}{9} - \frac{1}{5} =$ _____

5. $17\ \frac{4}{5} - \frac{6}{15} =$ _____

6. $8\ \frac{2}{3} - 1\ \frac{1}{2} =$ _____

7. $6 - 3\ \frac{1}{6} =$ _____

8. $4\ \frac{1}{3} - 2\ \frac{5}{6} =$ _____

9. $4 - 2\ \frac{1}{3} =$ _____

10. $5\ \frac{1}{6} - 2\ \frac{1}{4} =$ _____

11. $5\ \frac{7}{10} - 2\ \frac{3}{8} =$ _____

12. $6\ \frac{3}{10} - 4\ \frac{7}{15} =$ _____

13. $4\ \frac{5}{8} - 3\ \frac{2}{3} =$ _____

14. $5\ \frac{2}{3} - 3\ \frac{8}{9} =$ _____

BASIC MATH 1

ADDITION & SUBTRACTION OF MIXED NUMBERS
ANSWER KEYS

ADDITION:

1. 5 2/3	2. 5 1/10	3. 4 3/8	4. 12 2/15
5. 10 19/20	6. 5	7. 7 1/24	8. 6 5/8

SUBTRACTION:

1. 5 13/40	2. 1 5/12	3. 1 1/4	4. 2 1/45
5. 17 2/5	6. 7 1/6	7. 2 5/6	8. 1 1/2
9. 1 2/3	10. 2 11/12	11. 3 13/40	12. 1 5/6
13. 23/24	14. 1 7/9		

BASIC MATH 1

ADDITION & SUBTRACTION OF MIXED NUMBERS
QUIZ

1. 1 3/4 + 3 2/5 =

2. 9 1/8 + 3 5/6 =

3. 4 9/10 - 2 1/3 =

4. 5 1/6 - 2 3/4 =

5. 7 3/8 - 4 2/5 =

BASIC MATH 1

LESSON OBJECTIVES

MODULE: FRACTIONS

LESSON: PROBLEM SOLVING

LESSON OBJECTIVES:

Upon completion of this lesson students will be able to:

1. Identify whether a fraction (or mixed number) contained within a word problem represents a measurement (pounds, feet, gallons, etc.) or a fractional adjustment to another value (a part).

2. Be able to identify the operation required to solve a given word problem containing fraction and/or mixed numbers, and to perform the calculation in the correct sequence.

BASIC MATH 1

LESSON EXAMPLES
PROBLEM SOLVING WITH FRACTIONS

Lesson Objectives 1:

Use the homework assignment.

The purpose of this is to help students identify which problems will require size adjustments (the fractions which represent parts) versus those that will require another method. For fractions or mixed numbers that are measurements, one trick that often helps is to change the fraction or mixed number to a whole number and then see what operation the problem requires. Many (most?) students who have difficulty with word problems which contain fractions can solve the same problem quickly with whole numbers.

Lesson Objective 2:

Use the homework assignment.

Be sure to attempt problems requiring each of the operations.

BASIC MATH 1

FRACTION WORD PROBLEMS

1. An analysis was made of the reasons why N rail roof drip moldings were scrapped. The analysis showed that 1/4 of them had cuts or gouges, 3/10 of them had dings and 2/5 of them had RET height off. What fraction of the total is accounted for with these reasons?

2. Bill had a piece of metal, but found that it was 3/4 inches too long. He cut off 5/8 inches with a saw. How much remained to be cut off?

3. A proposed department budget cutback was 1/20 of the present budget of $55,000. How much was the proposed cutback?

4. If 1 3/4 gallons of paint are required for a day's job, how many days of paint can you get from a container containing 12 gallons?

5. If it takes 3/4 hour to complete a job and a work team has completed 2/3 of the job, how much time has the work team been working on the job?

6. The company had a stockpile that started out with 3/4 ton of sheet metal. If 1/2 ton has been used up, how much metal remains?

7. On Monday 3 1/2 dozen boxes of rivets were used. On Tuesday they used 2 1/4 dozen and on Wednesday they used 4 3/8 dozen. How many dozen rivets were used altogether?

8. A machine uses 1/4 gallon of fuel each hour it is running. How many hours can the machine run if the fuel tank contains 3 1/2 gallons?

9. The company spent 3/5 of it's yearly budget in the first 6 months. If 2/3 of the money was spent on salaries and benefits, what part of the entire year's budget was spent on the first 6 months of salaries and benefits?

10. Find the number of bolts in a box if the weight of all the bolts is 22 pounds and each bolt weighs 11/64 pounds.

11. A painter needs 3 pieces of tape measuring 24 3/4 inches, 15 7/8 inches and 13 15/16 inches. What is the total number of inches of tape the painter needs?

12. A basket contains 23 3/4 pounds of nails. If a worker removes 4 2/3 pounds of nails from the basket, how much do the nails left in the basket weigh?

13. A part for a door weighs 5/4 ounces. How many parts are there in a 60 ounce box?

14. If a work group consists of 36 people and 3/4 of them are men, how many workers are women?

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BASIC MATH 1

FRACTION WORD PROBLEMS
ANSWER KEY

1. 19/20	2. 1/8 inch	3. $2,750
4. 6 6/7 days	5. 1/2 hour	6. 1/4 ton
7. 10 1/8 dozen	8. 14 hours	9. 2/5
10. 128	11. 54 9/16 inches	12. 19 1/12 pounds
13. 48	14. 9	

BASIC MATH 1

FRACTION WORD PROBLEMS
QUIZ

1. How many workers are out sick, if 1520 workers are scheduled for the 7:00 - 3:00 shift but 1/8 of them are out sick?

2. A length of wire needs to be cut into 5 pieces. If the length of the wire before cutting is 12 3/8 inches, how long will each piece be (assuming there is no waste after cutting)?

3. Brian's needs to inventory the boxes left in three baskets at the end of a shift. The first basket has 10 1/3 boxes, the second basket has only 3/4 of a box, and the third basket has 8 full boxes. What is the total number of boxes left?

4. A work team has to complete 600 units in one day. As of noon, the team had complete 342 1/4 units. How many units remain to be completed in the afternoon?

PROPORTIONS

BASIC MATH 1

LESSON OBJECTIVES

MODULE: PROPORTIONS

LESSON: RATIOS AND RATES

LESSON OBJECTIVES:

Upon completion of this lesson students will be able to:

1. Define a ratio and write it in three forms: word format, a:b, a/b. (Emphasis will be placed on the fractional representation.)
2. Simplify ratios to lowest terms.
3. Define a rate and distinguish it from a ratio.
4. Calculate a unit rate.
5. Determine, using cross multiplication, if given ratios are or are not proportional.

Ratios should be presented in the form of word problems as numerical format.

BASIC MATH 1

RATIOS AND RATES
LESSON EXAMPLES

Lesson Objectives 1 & 2:

2 pounds with zero defects to 1 pounds defective

60 men to 45 women

2 hours to 45 minutes

20 minutes to 3 hours

Lesson Objectives 3 & 4:

8 hours earns $60

480 miles on 20 gallons

37 1/2 employee absences in 5 days

1000 yards in 12 minutes

Lesson Objective 5:

5/15, 6/18 11/16, 21/32 24/1.3, 2.6/4.8

Machine A produces 150 parts in 60 minutes while Machine B produces 45 parts in 18 minutes. Do the machines work at the same rate?

Betty can install 28 parts in 24 minutes while Paul can install 18 parts in 20 minutes. Do Betty and Paul work at the same rate?

BASIC MATH 1

RATIOS AND PROPORTIONS

1. What is the ratio in lowest terms of 20 minutes to 2 hours?

2. What is the ratio in lowest terms of 3 hours to 90 minutes?

3. A work group has 15 men and 10 women.

   a. What is the ratio of men to women?

   b. What is the ratio of women to men?

4. The company spends 16 cents on size B bolts and 64 cents on size M bolts.

   a. What is the ratio of money spent on size B bolts to money spent on size M bolts.

   b. What is the ratio of money spent on size M bolts to money spent on size B bolts.

FOR PROBLEMS 5 - 7: ARE THE FOLLOWING RATIOS EQUAL?

5. $\frac{3}{4}$ $\frac{54}{72}$

6. $\frac{\frac{1}{3}}{8}$ $\frac{2}{48}$

7. $\frac{0.3}{8}$ $\frac{2}{50}$

8. Jeff takes 16 minutes to install 3 parts and Michelle can install 9 of the same parts in 48 minutes. Do Jeff and Michelle work at the same rate?

9. Fifty 1/2" screws sell for $0.20 and eighty 5/8" screws sell for $0.30. Do the two types of screws sell at the same rate?

10. An older method for making car bodies resulted in 12 pieces of scrap for every 150 pieces made. The new method results in 5 pieces of scrap for every 195 pieces made. Do the two methods have the same scrap rate?

BASIC MATH 1

UNIT RATES

FIND THE UNIT RATE FOR EACH OF THE FOLLOWING:

1. 2400 upper channels in 4 hours _____

2. 885 rear support rivets in 3 hours _____

3. 120 pieces of scratched glass in 5 days _____

4. 420 pieces packed in 8 hours _____

5. 6760 soap dish handles installed in 8 hours _____

6. 96 handles inspected in 5 minutes _____

7. 292.5 miles in 4.5 hours _____

8. 382.5 accuators installed in 45 minutes _____

9. 132 1/2 revolutions in 3 1/2 minutes _____

10. 1002 3/4 pounds of scrap in 5 1/4 days _____

BASIC MATH 1

RATIOS AND RATES
ANSWER KEYS

RATIOS & PROPORTIONS:

1. 1/6
2. 2/1
3. a. 3/2 b. 2/3
4. a. 1/4 b. 4/1
5. yes
6. yes
7. no
8. yes
9. no
10. no

UNIT RATES:

1. 600 channels per hour
2. 295 rivets per hour
3. 24 pieces per day
4. 52.5 pieces per hour
5. 845 handles per hour
6. 19.2 handles per minute
7. 65 mph
8. 8.5 accuators per minute
9. 55 rpm
10. 191 lbs. per day

BASIC MATH 1

RATIOS & RATES
QUIZ

1. What is 3 hours to 45 minutes in lowest terms?

2. Are the following proportional? $\frac{3.2}{0.2}$ & $\frac{4.8}{0.3}$

3. Alex can install 54 parts in 12 minutes and Bob can install 100 parts in 22 minutes. Do they work at the same rate?

4. Find the unit rate for:

   900 parts in 45 minutes

BASIC MATH 1

LESSON OBJECTIVES

MODULE: PROPORTIONS

LESSON: SOLVING PROPORTIONS

LESSON OBJECTIVES:

Upon completion of this lesson students will be able to:

1. Calculate the missing value when given proportions in numerical format using the technique of "cross multiply, then divide".

2. Set up and solve proportions for the missing value when given proportions in word problems.

BASIC MATH 1

SOLVING PROPORTIONS
LESSON EXAMPLES

Lesson Objective 1:

$\frac{?}{36} = \frac{1}{3}$ $\frac{10}{?} = \frac{15}{12}$ $\frac{6}{9} = \frac{3\ 1/3}{?}$

$\frac{?}{0.6} = \frac{0.04}{0.12}$ $\frac{1/2}{1/4} = \frac{?}{1/3}$

Lesson Objective 2:

If two parts cost $17.50, how much will 7 parts cost?

A car travels 165 miles in 3 hours. How far will travel in 8 hours?

If 5 gallons of paint are needed for 1000 parts, how much is needed for 1600 parts?

If 2 parts are defective for every 150 parts checked, how many parts must be checked before 5 defective parts are found?

It takes a machine 20 5/6 minutes to produce 2 1/2 parts. How many parts will the machine produce in 33 1/3 minutes?

BASIC MATH 1

SOLVING PROPORTIONS

FOR PROBLEMS 1 - 5: SOLVE FOR THE MISSING NUMBER

1. $\frac{2}{?} = \frac{1}{4}$

2. $\frac{20}{15} = \frac{100}{?}$

3. $\frac{\frac{1}{2}}{2} = \frac{3}{?}$

4. $\frac{0.2}{2} = \frac{1.2}{?}$

5. $\frac{?}{1.5} = \frac{2.5}{7.5}$

6. If a copy machine can produce 90 copies in 1 minute, how long will it take the machine to produce 360 copies?

7. If 5 pounds of packing material are used for 300 packages, how many packages can you pack with 17.5 pounds of packing material?

8. A worker inspected 200 door handles and found 18 defective. At this rate, how many defective handles would you expect there to be in a shipment of 12,000 handles?

9. If 15 parts cost $1.20, how much will 20 parts cost?

10. A work team managed to complete 4 units in 12 minutes. If they continue at that rate, how many units can they complete in 90 minutes?

11. The instructions for a cleaning product say that for every 5 ounces of cleaner you use 4 quarts of water. At that rate, how many ounces of cleaner should you add to 10 quarts of water?

12. If the company reimburses employees at the rate of $0.25 per mile, how many miles was driven if the company paid an employee $14?

BASIC MATH 1

EVERYDAY PROPORTION WORD PROBLEMS

1. 12 apples cost $0.99. Find the cost of 4 apples.

2. 3 bananas cost $0.24, Find the cost of 19 bananas.

3. At a special sale on men's shirts you get three shirts for $29.94. How much would 5 shirts cost?

4. 3 batteries sell for $2.99. Find the cost of 10 batteries.

5. A lazer printer can produce 120 copies in 40 seconds. How many seconds will it take the printer to produce 180 pages?

6. If a car uses 12 gallons of gas to travel 216 miles, how many gallons are needed to travel 2970 miles?

7. On a map 1/2 inch represents 4 actual miles. How many miles apart are two cites if they measure 12 inches apart on the map?

8. A local school's talent show was attended the first night by 448 people and earned the school $1568. How many people attended the second night if the school earned $1813 that night?

9. How long will it take to go 142.5 miles, if it took you 5.5 hours to go 313.5 miles?

10. If 4 pounds of hamburger cost $9.50, how much will 6 pounds cost?

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BASIC MATH 1

SOLVING PROPORTIONS
QUIZ

1. Find the missing value: $\frac{0.8}{3} = \frac{1.2}{?}$

2. How long will it take you to go 380 miles if it took you 2.5 hours to go 125 miles?

3. Scott can inspect 15 parts in 45 seconds. At that rate, how many parts can he inspect in 60 seconds?

4. How much will it cost to buy 200 parts if 75 parts cost $2.25?

BASIC MATH 1

SOLVING PROPORTIONS
ANSWER KEYS

SOLVING PROPORTIONS:

1. 8 2. 75 3. 12 4. 12 5. 0.5
6. 4 minutes
7. 1050 packages
8. 1080 handles
9. $1.60
10. 30 units
11. 12.5 ounces
12. 56 miles

EVERYDAY WORD PROBLEMS:

1. $0.33 2. $1.52 3. $49.90
4. $9.97 5. 60 sec. 6. 165 gal.
7. 96 mi. 8. 518 9. 2.5 hrs.
10. $14.25

BASIC MATH 1

LESSON OBJECTIVES

MODULE: PERCENTS

LESSON: DECIMAL/FRACTION/PERCENT CONVERSIONS

LESSON OBJECTIVES:

Upon completion of this lesson students will be able to:

1. Perform decimal to fraction and fraction to decimal conversions. (This is a review.)
2. Define a percent, list common uses for percents and compare percents (as an indication of their advantage over fractions).
3. Convert percents into fractions.
4. Convert percents into decimals.
5. Convert decimals into percents.
6. Convert fractions into percents.

BASIC MATH 1

DECIMAL/PERCENT/FRACTION CONVERSIONS
LESSON EXAMPLES

Lesson Objective 1:

$0.8 = 4/5$ $0.75 = 3/4$ $0.\overline{3} = 1/3$ $0.05 = 1/20$

$1/2 = 0.5$ $2/3 = 0.\overline{6}$ $1/8 = 0.125$ $1/4 = 0.25$

Lesson Objective 2:

No examples are needed.

Lesson Objective 3:

10% = 1/10 75% = 3/4 25% = 1/4 50% = 1/2

20% = 1/5 87 1/2% = 7/8 2/5% = 0.004

33 1/3% = 1/3 62.5% = 5/8 0.9% = 9/1000

Lesson Objective 4:

30% = 0.3 90% = 0.9 37.5% = 0.375 7.5% = 0.075

78 1/2% = 0.785 1/4% = 0.0025

Lesson Objective 5:

0.8 = 80% 3 = 300% 3.25 = 325% $0.58\overline{3}$ = 58 1/3%

$0.\overline{3}$ = 33 1/3% 0.6 = 66 2/3%

Lesson Objective 6:

1/2 = 50% 3/5 = 60% 3/4 = 75% 3/10 = 30%

2 2/5 = 240% 1 5/6 = 183 1/3%

BASIC MATH 1

CONVERSION FROM PERCENTS INTO DECIMAL & FRACTIONS

CONVERT THE FOLLOWING PERCENTS INTO EQUAL DECIMALS:

1. 30% = _____
2. 45% = _____
3. 60% = _____
4. 150% = _____
5. 6.25% = _____
6. 7.8% = _____
7. 12.3% = _____
8. 126.2% = _____
9. 3/4% = _____
10. 53 1/2% = _____
11. 9 1/10% = _____
12. 125 1/4% = _____

CONVERT THE FOLLOWING PERCENTS INTO EQUAL FRACTIONS:

13. 75% = _____
14. 20% = _____
15. 6% = _____
16. 145% = _____
17. 9.25% = _____
18. 0.5% = _____
19. 200.8% = _____
20. 25.5% = _____
21. 6 1/3% = _____
22. 4/5% = _____
23. 53 3/4% = _____
24. 100 4/7% = _____

BASIC MATH 1

CONVERSIONS FROM FRACTIONS & DECIMALS INTO PERCENTS

CONVERT THE FOLLOWING DECIMALS INTO PERCENTS:

1. 0.475 = _____

2. 0.05 = _____

3. 1 = _____

4. 3.25 = _____

5. $0.\overline{3}$ = _____

6. $0.2\overline{6}$ = _____

CONVERT THE FOLLOWING FRACTIONS INTO PERCENTS:

7. 3/10 = _____

8. 3/8 = _____

9. 3/4 = _____

10. 1/3 = _____

11. 2 4/5 = _____

12. 5 1/4 = _____

BASIC MATH 1

DECIMAL/FRACTION/PERCENT CONVERSIONS
ANSWER KEY

FROM PERCENTS TO DECIMALS & FRACTIONS:

1. 0.3	2. 0.45	3. 0.6
4. 1.5	5. 0.0625	6. 0.078
7. 0.123	8. 1.262	9. 0.0075
10. 0.535	11. 0.091	12. 1.2525
13. 3/4	14. 1/5	15. 3/50
16. 1 9/20	17. 33/400	18. 1/200
19. 2 1/125	20. 51/200	21. 1/12
22. 1/125	23. 43/80	24. 1 1/175

FROM FRACTIONS & DECIMALS INTO PERCENTS:

1. 47.5%	2. 5%	3. 100%
4. 325%	5. 33 1/3%	6. 26 2/3%
7. 30%	8. 37 1/2%	9. 75%
10. 33 1/3%	11. 280%	12. 525%

BASIC MATH 1

DECIMAL/FRACTION/PERCENT CONVERSIONS
QUIZ

1. What is 0.8 expressed as a percent?

2. What is 4/5 expressed as a percent?

3. What is 33 1/3% expressed as a fraction?

4. What is 112.8% expressed as a decimal?

BASIC MATH 1

LESSON OBJECTIVES

MODULE: PERCENTS

LESSON: SOLVING PERCENT PROBLEMS

LESSON OBJECTIVES:

Upon completion of this lesson students will be able to:

1. Identify the parts (percent, base and amount) of a percent word problem in the form of "percent of base is amount".
2. Solve a percent word problem where the amount is missing.
3. Solve a percent word problem where the base is missing.
4. Solve a percent word problem where the percent is missing.

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BASIC MATH 1

SOLVING PERCENT PROBLEMS
LESSON EXAMPLES

Lesson Objective 1:

no examples needed

Lesson Objective 2:

What is 20% of 55?

What is 15% of 60.2?

What is 10% of 6 2/3?

40% of 25 is what number?

Lesson Objective 3:

65% of what number is 39?

45% of what number is 9?

2.25 is 9% of what number?

19 1/2 is 65% of what number?

Lesson Objective 4:

What percent of 75 is 30?

What percent of 200 is 130?

What percent of 24 is 0.12?

What percent of 3/4 is 3/8?

BASIC MATH 1

BASIC PERCENT WORD PROBLEMS

SOLVE EACH OF THE FOLLOWING PROBLEMS:

1. 13 is 26% of what number?

2. 85 is what percent of 340?

3. 124 is 200% of what number?

4. 43% of 300 is what number?

5. 19 is what percent of 4.75?

6. What number is 152% of 16?

7. 1.25 is what percent of 2.5?

8. What number is 83 1/3% of 48?

9. 200 is 33 1/3% of what number?

10. What percent of 80 is 26 2/3?

11. 66 2/3% of 72 is what number?

12. What number is 8.5% of 188?

13. 10 1/5 is what percent of 5 1/10?

14. What number is 60% of 16.2?

15. 18.75 is 15% of what number?

16. What percent of 150 is 30?

17. What is 3.7% of 110?

18. 1/10% of what number is 78?

BASIC MATH 1

PERCENT WORD PROBLEMS
ANSWER KEY

BASIC PERCENT WORD PROBLEMS:

1. 50	2. 25%	3. 62
4. 129	5. 400%	6. 24.32
7. 50%	8. 40	9. 600
10. 33 1/3%	11. 48	12. 15.98
13. 200%	14. 9.72	15. 125
16. 20%	17. 4.07	18. 78,000

BASIC MATH 1

PERCENT WORD PROBLEMS
QUIZ

1. What is 40% of 85?

2. 30% of what number is 15 ?

3. 35 is what percent of 105?

4. 8.25 is 25% of what number?

5. What percent of 1/2 is 1/8? ?

BASIC MATH 1

LESSON OBJECTIVES

MODULE: PERCENTS

LESSON: PERCENT WORD PROBLEMS & SHORTCUTS

LESSON OBJECTIVES:

Upon completion of this lesson students will be able to:

1. Solve percent word problems when the amount is missing using the following shortcuts:

   a. relationship of the given percent to 10%
   b. relationship of the percents 25%, 33 1/3%, 50%, 66 2/3% and 75% to common fractions.

2. Solve story problems (exclusive of percent increase or decrease problems) when the amount is missing.

3. Solve story problems when the base is missing.

4. Solve story problems when the percent is missing.

BASIC MATH 1

PERCENT WORD PROBLEMS & SHORTCUTS
LESSON EXAMPLES

Lesson Example 1:

What is 10% of 50? What is 10% of 5?

What is (use multiples of 10% here) of 250?

What is 25% of 4? What is 25% of 75?

What is 33 1/3% of 60? What is 33 1/3% of 50?

What is 50% of 30? What is 50% of 25?

What is 66 2/3% of 120? What is 66 2/3% of 90?

What is 75% of 20? What is 75% of 80?

Lesson Objective 2:

John used 80% of the 240 parts in the basket. How many parts did he use?

On Friday only 2% of the 1200 door handles inspected were defective. How many door handles were defective?

Lesson Objective 3:

If 40% of a work group is women and there are 30 women, how many people are in the work group?

A student gets 22 questions correct on a test and the grade is 88%. How many questions were there on the test?

Lesson Objective 4:

When Anne was filling out her daily log book for defective parts she noticed that she had 32 defective parts out of 400 parts checked. What percent of her parts were defective?

The work quota for the day is 1200 parts and the crew has completed 625 parts. What percent of the parts have they completed?

BASIC MATH 1

PERCENT SHORTCUTS

1. What is 10% of 24?

2. What is 10% of 70?

3. What is 5% of 24?

4. What is 5% of 70?

5. What is 15% of 24?

6. What is 15% of 70?

7. What is 20% of 15?

8. What is 30% of 75?

9. What is 33 1/3% of 180?

10. What is 33 1/3% of 80?

11. What is 25% of 200?

12. What is 25% of 35?

13. What is 50% of 72?

14. What is 50% of 19?

15. What is 66 2/3% of 60?

16. What is 66 2/3% of 270?

17. What is 75% of 16?

18. What is 75% of 144?

BASIC MATH 1

PERCENT WORD PROBLEMS

1. If 5% of the parts delivered to the company are plastic, how many plastic parts are there in a shipment of 1250 parts?

2. Approximately 35% of people who work for a company smoke ciggarettes. If the company employs 5,000 workers, how many of the employees smoke?

3. Company charts show that 5 out of every 22 door handles are blue. What percent of the door handles are blue?

4. A department spent 12% of each 40 hour week working on seat adjusters. How many hours do they spend on seat adjusters?

5. A survey of employee attitudes showed that only 19.3% of all employees were not concerned about job loss. If 386 people said they were not concerned about job loss, how many people took the survey?

6. Approximately 31 out of 300 parts were found to be defective. What percent of the parts were defective?

7. A personnel department determined that on average 5.5% of the scheduled workforce call in sick each day. If there are 2400 workers scheduled per day, how many workers call in sick?

8. At the start of a shift a department had only 12 1/4 baskets of parts which was only 25% of what they needed to complete the day's work. How many baskets of parts did the department need to complete the job?

9. Twenty-six out of 160 people in a plant are under the age of 28. What percent of the people are under age 28?

10. By noon a group of painters had used 85% of the 25 1/3 gallons of paint they started the day with. How many gallons of paint had they used?

11. From Jeff's weekly pay 6.8% is deducted for Social Security. If his pay stub showed that $39.10 was taken out, how much was his weekly pay (before deductions)?

12. On a test worth 60 points a student answered 45 correctly. What was his percent score on the test?

BASIC MATH 1

PERCENT WORD PROBLEMS & SHORTCUTS
ANSWER KEYS

PERCENT SHORTCUTS:

1. 2.4	2. 7	3. 1.2	4. 3.5
5. 3.6	6. 10.5	7. 3	8. 22.5
9. 60	10. 26 2/3	11. 50	12. 8.75
13. 36	14. 9.5	15. 40	16. 180
17. 12	18. 108		

PERCENT WORD PROBLEMS:

1. 62.5	2. 1750	3. 22 8/11%
4. 4.8 hrs.	5. 2000	6. 10 1/3%
7. 132	8. 49	9. 16.25%
10. 21 8/15 gal.	11. $575	12. 75%

BASIC MATH 1

PERCENT WORD PROBLEMS & SHORTCUTS
QUIZ

1. What is 20% of 35?

2. What is 25% of 20?

3. In a town of 13,000 potential workers, the unemployment rate is 8.5%. How many workers are unemployed?

4. A work crew has loaded 2 1/4 tons of the 5 tons of scrap to be loaded into trucks. What percent of the scrap has been loaded.

5. A car dealer estimates that 5.6% of the customers who sign a contract will back out. If in the month of May 7 people backed out of their contracts, how many customers signed contracts?

BASIC MATH 1

LESSON OBJECTIVES

MODULE: PERCENTS

LESSON: PERCENT INCREASE & DECREASE

LESSON OBJECTIVES:

Upon completion of this lesson students will be able to:

1. Identify the formula (and its parts) for calculating percent increase and decrease problems.
2. Calculate percent increase or decrease when given the starting and ending values.
3. Calculate the new value if given the rate of increase or decrease and the original value.
4. Calculate the original value when given the rate of increase or decrease and the amount of increase or decrease.
5. Solve percent increase and decrease problems presented in word problems.

BASIC MATH 1

PERCENT INCREASE & DECREASE
LESSON EXAMPLES

Lesson Objective 1:

Use examples to be worked out for Objectives 2 and 3.

Lesson Objective 2:

What is the percent increase from 60 to 75?

What is the percent decrease from $30.36 to $27.83?

What is the percent increase from 25 1/2 to 30 3/5?

What is the percent decrease from $1.20 to $0.42?

Lesson Objective 3:

What is the new amount if the original value is 100 and the rate of increase is 7%?

What is the new amount if the rate of decrease is 6% and the original amount is 50?

What its the new amount if the original value is 60 and the rate of increase is 16 2/3%?

Lesson Objective 4:

What is the original value if the rate of increase is 70% and the amount of increase is 7?

What is the original value if the amount of decrease is 9 and the rate of decrease is 9%?

Lesson Objective 5:

The pounds of scrap generated by a new material decreased from 152 pounds to 110 pounds per week. What was the percent decrease in the pounds of scrap generated per week?

A purchasing agent lowered the cost of a part by 6%. If the original cost of the part was $4.00, what is the new cost of the part?

The average fuel efficiency of new cars was increased by about 166 2/3% in the 1970's when the new regulations went into effect. If the reduction amounted to about 15 mpg, what was the average gas mileage of new cars before the regulations took effect?

BASIC MATH 1

PERCENT INCREASE & DECREASE

1. What is the percent increase from 115 to 161? _____

2. What is the percent increase from 450 to 600? _____

3. What is the percent decrease from 1400 to 1225? _____

4. What is the percent decrease from 425 to 416.5? _____

5. What is the percent increase from 2.5 to 2.9? _____

6. What is the percent increase from 5/6 to 1 1/4? _____

7. What is the percent decrease from 8 to 7 1/2? _____

8. What is the percent increase from 2 9/10 to 7 1/4? _____

9. What is the amount of decrease if the decrease is 8% and the original is 3850? _____

10. What is the amount of increase if the increase is 1/10% and the original is 14,500? _____

11. What is the new amount if the decrease is 22% and the original is 228? _____

12. What is the new amount if the increase is 75% and the original is 8.24? _____

BASIC MATH 1

PERCENT INCREASE & DECREASE WORD PROBLEMS

1. A part that normally sells for $35 has been reduced in price by 15% due to volume buying. What is the lower price of the part?

2. A work group's quota has dropped by 4 units per day. If this represents 25% of their prior quota, what was their prior quota?

3. A distributor buys a part at a cost of $1.20 each and sells the part for $2.28 each. What is his mark-up on the part?

4. A car's sticker price is $17,550 but is reduced in price to $15,444. What is the percent decrease in the price of the car?

5. A quality operator making $16.50 per hour receives an 8% raise. What is his new hourly wage?

6. A company plans to reduce its workforce from 12,500 workers to 10,000 workers. What is the percent reduction in the work force.

7. A auto distributor reported a 6 1/4% decrease in sales compared to the month before. If that meant he sold 112 fewer cars, how many cars had he sold the month before?

8. The cost of a part, which originally cost $4.80, rose by 2.5%. What is the new cost of the part?

9. During the first year, a new car that cost $15,560 depreciates in value by 30%. By now much does the value of the car decline?

10. Department A used 40% fewer sick days than Department B. If Deparment B used 160 days, how many sick days did Department A use?

BASIC MATH 1

PERCENT INCREASE & DECREASE
ANSWER KEYS

INCREASE & DECREASE:

1. 40%	2. 33 1/3%	3. 12.5%
4. 2%	5. 16%	6. 50%
7. 6 1/4%	8. 150%	9. 308
10. 14.5	11. 177.84	12. 14.42

INCREASE & DECREASE WORD PROBLEMS:

1. $29.75	2. 16	3. 90%
4. 12%	5. $17.82	6. 20%
7. 1,792	8. $4.92	9. $4,668
10. 96		

BASIC MATH 1

PERCENT INCREASE & DECREASE
QUIZ

1. What is the percent increase from 4 to 5?

2. What is the percent decrease from 0.4 to 1.2?

3. An item was discounted from $200 to $180. What was the rate of discount?

4. Zandie got a wage increase of $5 per hour which was a 25% raise. What was her former hourly wage?

BASIC MATH 1

LESSON OBJECTIVES

MODULE: PERCENTS

LESSON: APPLICATIONS OF PERCENTS

LESSON OBJECTIVES:

Upon completion of this lesson students will be able to:

1. Calculate sales tax, purchase price or sales tax rate when given the other components of a sales tax problem.

2. Calculate the amount of commission, commission rate or total sales when given the other components of a commission problem.

3. Calculate the simple interest earned or charged when given the principal, rate and length of time for the investment or loan.

BASIC MATH 1

APPLICATIONS OF PERCENTS
LESSON EXAMPLES

Lesson Objective 1:

a. What is the sales tax charged for a purchase of $89 if the sales tax rate is 5%?

What is the sales tax charged for a purchase of $20 if the sales tax rate is 4 1/8%?

b. What is the purchase price if the sales tax is $1.25 and the sales tax rate is 3%?

What is the purchase price if the sales tax rate is 6 1/4% and the sales tax charged is $3.75?

c. What is the tax rate if the item's price is $5 and the tax is $0.15?

What is the sales tax rate if the tax is $6.90 on a $92 purchase?

Lesson Objective 2:

a. What is the commission earned on sales of $500 if the commission rate is 10%?

How much commission is earned on sales of $112.53 if the commission rate is 12%?

b. What is the commission rate if the sales amount to $300 and the amount of commission earned is $60?

What is the commission rate if the commission on $127.50 amounts to $850?

c. What is the total sales if $24 is earned in commission at 3%?

What is the total sales if the commission rate is 40% and the amount of commission is $302.50?

Lesson Objective 3:

a. What is the simple interest charged on a loan of $7,000 at 20% per year for 3 1/2 years?

b. What is the simple interest charged on an investment of $6,000 for 6 months paying 8% per year

c. What is the simple interest charged on a loan of $13,500 at an annual rate of 12% per year for 48 months?

d. What is the simple interest charged for a loan of $750 for 1 year 3 months at an annual rate of 7%?

BASIC MATH 1

SIMPLE INTEREST

1. What is the simple interest charged on a loan of $2500 at a rate of 12% per year for 3 years?

2. What is the simple interest charged on a loan of $15,000 at a rate of 10 1/4% per year for 4 years?

3. What is the simple interest charged on a loan of $425 at an annual rate of 7% for 24 months?

4. What is the simple interest charged on a loan of $13,000 at an annual rate of 9.5% for 60 months?

5. What is the simple interest charged on a loan of $1000 for 60 months at 2 1/4% per year?

6. What is the simple interest charged on a loan of $200 for 9 months at 6% per year?

7. What is the simple interest charged on a loan of $800 for 1 year 3 months at a rate of 15% per year?

8. What is the simple interest charged on a loan of $300 for 2 years 6 months at an annual rate of 14%?

BASIC MATH 1

SALES TAX & COMMISION

1. What is the sales tax on a $45 purchase if the sales tax rate is 5%?

2. What purchase price has sales tax of $2.10 if the sales tax rate is 6%?

3. If the purchase price is $160 and the sales tax is $3.60, what is the sales tax rate?

4. What is the total cost of an item whose purchase price is $19.95 if the sales tax rate is 7%?

5. Brian gets a 10% commission on everything he sells in the store. If he sold $650 worth of goods, how much commission did he earn?

6. In January a store paid out $1252 in commissions to its employees and the commission rate is 5%, how much were its total sales?

7. Robert sold an old bass amplifier for $350 but had to give the store that sold it a commission of $63. What was the commission rate that the store charged Robert?

8. Scott and Ellen sold their house for $140,000. They paid their real estate agent the standard 6% commission for the sale. Their real estate agent then had to split the 6% commission evenly with the buyer's real estate agency. The buyer's real estate agent then received 1/2 of that (the other half goes to the real estate <u>agency</u>). How much money did the buyer's <u>agent</u> make?

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BASIC MATH 1

APPLICATIONS OF PERCENTS
QUIZ

1. What is the total cost (including tax) of an item whose ticketed price is $14.99 if the sales tax rate is 7%?

2. Brian works on a 15% commission basis selling water purifiers. How much does he earn in commission if he sells $650 worth of purifiers?

3. Ruby is a real estate broker that averages 4% commission on the homes that she sells. What is the total amount of sales she needs in order to make $25,000 per year?

4. What is the simple interest charged on a loan of $13,500 at 11% per year for 4 years?

5. What is the simple interest charged on a loan of $500 at 8% per year for 36 months?

BASIC MATH 1

APPLICATIONS OF PERCENTS
ANSWER KEYS

SALES TAX & COMMISSION:

1. $2.25	2. $35	3. 2.25%
4. $21.35	5. $65	6. $25,040
7. 18%	8. $2100	

SIMPLE INTEREST:

1. $900	2. $6,150	3. $59.50
4. $6,175	5. $112.50	6. $9
7. $150	8. $105	

BASIC MATH 1

PRE-TEST

FORM A

TO THE STUDENT: This test is designed to give you an example of the basic math computations you will be learning in this course. You will have **60 minutes** to take the test. All answers should be marked on the answer sheet provided. Work as quickly as possible. If you cannot do a problem, move on to the next one. Remember, you're not expected to be able to do well on all of these questions -- that's why your here! Just do the best that you can.

DO NOT WRITE ON THE TEST !!!!

1. In 39.1852, what is the value of the 8?

a. tenths b. hundreds c. hundredths d. none of these

2. The correct symbol for ? in 74,921 ? 74,912 is

a. < b. > c. = d. all of these

3. The sum of 125 and 23.63 and 8.731 is

a. 123.44 b. 157361 c. 157.361 d. 15.7361

4. 2.4 - 0.146 is

a. 2.346 b. 2.5 c. 2.254 d. 2.546

5. The product of 2.8 x 1.06 is

a. 2.968 b. 29.68 c. 296.8 d. 2968

6. The quotient of 22.4 ÷ 0.04 is

a. 56 b. 5.60 c. 560 d. 5,600

7. The product of 2 2/3 x 2 1/4 in simplest form is

a. 4 1/6 b. 6/1 c. 72/12 d. 6

8. The quotient of 12 ÷ 3/4 in simplest form is

a. 9/1 b. 9 c. 48/3 d. 16

9. The sum of 3/4 + 3/4 in simplest form is

a. 9/16 b. 6/4 c. 3/2 d. 1 1/2

10. The least common denominator for 1/4 and 5/6 and 7/20 is

a. 2 b. 20 c. 12 d. 60

11. The sum of 2/3 + 3/4 in simplest form is

a. 5/12 b. 1 5/12 c. 6/12 d. 1/2

12. 6 - 1 3/4 in simplest form is

a. 5 3/4 b. 5 1/4 c. 4 1/4 d. 4 3/4

13. 0.06 renamed as an equal percent is

a. 60% b. 6% c. 600% d. 0.6%

14. 3/4 renamed as an equal percent is

a. 3/4% b. 3/400% c. 400/300% d. 75%

15. 40% of 25 is

a. 10 b. 1000 c. 100 d. 62.5

16. 36 is 75% of

a. 48 b. 2.08 c. 18 d. 4.8

17. John Smith wins an election 90 to 60. What percent of the vote did he get?

a. 90% b. 60% c. 40% d. 65%

18. Mary buys a $250 sewing machine. She gets a 20% discount. How much does she pay for the sewing machine?

a. $230 b. $50 c. $200 d. $150

19. If 3 pounds of a certain chemical costs $4, how many pounds of that chemical can be purchased with $23?

a. 17.25 lbs. b. 276 lbs. c. 22 lbs. d. 18.25 lbs.

20. The area of a triangle with a base of 4 inches and height of 6 inches is (area of a triangle = 1/2 x base x height)

a. 24 in^2 b. 12 in. c. 12 in^2 d. none of these

21. Linda writes the following checks: rent $155; groceries $27.86; jeans $21.57; drugstore $7.11. What is the new balance if she had $546.80 in her checkbook before she wrote all these checks?

a. $335.26 b. $211.54 c. $235.35 d. $342.46

22. The Smiths sold their home through a real estate agency. The agent's commission was 8% of the selling price. What was the selling price of the house if the Smiths received $44,160 after paying the agent?

a. $35,328 b. $48,000 c. 79,488 d. 47,692.80

23. A skirt pattern calls for 2 1/4 yards of fabric and the matching shirt pattern calls for 1 1/8 yards. How much fabric is left if June started with a 6-yard piece of fabric?

a. 3 1/6 b. 2 5/6 c. 3 3/8 d. 2 5/8

24. A recipe calls for 1/2 cup of water and 1 3/4 cups of flour. How much of each of these ingredients should you use if you want to make 2/3 of the recipe?

a. 1/3 cup of water and 1 1/6 cups of flour

b. 7/6 cup of water and 2 5/12 cups of flour

c. 4/3 cups of water and 8/21 cups of flour

d. 1 cup of water and 1 cup of flour

25. Over a 3-week period James bought 10.33 gallons, 9.92 gallons and 12.36 gallons of gas. What is the average amount of gas James bought each week?

a. 10.84 gal. b. 32.51 gal. c. 10.87 gal. d. 10.67 gal.

BASIC MATH 1

PRE-TEST

FORM B

TO THE STUDENT: This test is designed to give you an example of the basic math computations you will be learning in this course. You will have **60 minutes** to take the test. All answers should be marked on the answer sheet provided. Work as quickly as possible. If you cannot do a problem, move on to the next one. Remember, you're not expected to be able to do well on all of these questions -- that's why your here! Just do the best that you can.

DO NOT WRITE ON THE TEST !!!!

1. In 34.9281, what is the value of the two?

   a. hundreds b. hundredths c. tenths d. none of these

2. The correct symbol for ? in 17,843 ? 17,834 is

   a. < b. > c. = d. all of these

3. The sum of 134 and 25.76 and 6.542 is

   a. 166.302 b. 225.18 c. 16.6302 d. 166302

4. 1.5 - 0.125 is

   a. 2.5 b. 1.425 c. 1.375 d. 1.625

5. The product of 3.4 x 1.02 is

   a. 3.468 b. 34.68 c. 346.8 d. 3468

6. The quotient of 25.2 ÷ 0.02 is

   a. 126 b. 12.6 c. 1,260 d. 12,600

7. The product of 2 4/5 x 7 1/2 in simplest form is

   a. 14 1/5 b. 21/1 c. 210/10 d. 21

8. The quotient of 18 ÷ 3/5 in simplest form is

   a. 30/1 b. 10 4/5 c. 90/3 d. 30

9. The sum of 6/8 + 6/8 in simplest form is

   a. 12/16 b. 12/8 c. 3/4 d. 1 1/2

10. The least common denominator for 3/4 and 9/10 and 7/12 is

a. 12 b. 2 c. 60 d. 24

11. The sum of 3/4 + 4/5 in simplest form is

a. 12/20 b. 1 11/20 c. 7/20 d. 3/5

12. 7 - 1 3/5 in simplest form is

a. 5 2/5 b. 6 3/5 c. 6 2/5 d. 5 3/5

13. 0.08 renamed as an equal percent is

a. 80% b. 8% c. 800% d. 0.8%

14. 1/4 renamed as an equal percent is

a. 1/4% b. 100/4 c. 4/100% d. 25%

15. 25% of 40 is

a. 0.625 b. 100 c. 1.6 d. 10

16. 12 is 75% of

a. 16 b. 9 c. 0.0625 d. 0.16

17. Ralph Smith wins an election 124 to 76. What percent of the vote did he get?

a. 124% b. 62% c. 38% d. 65%

18. Barbara buys a $300 camera. She gets a 15% discount. How much does she pay for the camera?

a. $285 b. $45 c. $255 d. $200

19. If 5 pounds of a certain imported coffee costs $8, how many pounds of that coffee can be purchased with $26?

a. 16.25 lbs. b. 162.5 lbs. c. 41.60 lbs. d. 130 lbs.

20. The area of a triangle with a base of 10 inches and a height of 8 inches is (area of a triangle = 1/2 x base x height)

a. 80 in^2 b. 40 in. c. 40 in^2 d. none of these

21. Bill had a balance of $823.92 in his checkbook before he wrote 4 checks. The checks were written for rent $231; credit card $33.82; groceries $19.23 and gas bill $62.11. What is Bill's new balance after writing the checks?

a. $477.76 b. $345.16 c. 343.16 d. $487.86

22. The Jones family sold a piece of land through a real estate agency. The commission for the agent that sold it was 7% of the selling price. What was the selling price of the land if the Jones family received $18,600 after paying the agent?

a. $13,020 b. $31,620 c. $20,000 d. $19,902

23. The pattern for a clown costume calls for 3 3/8 yards and the pattern for the hat of the same fabric calls for 1 1/2 yards. How much fabric is left if the seamstress started with 8 yards of fabric?

a. 2 7/8 yards b. 3 1/4 yards c. 4 1/2 yards d. 3 1/8 yards

24. A punch recipe calls for 12 1/6 cups of ginger ale and 8 cups of orange juice. How much of the ingredients should you use if you want to make 3/4 of the recipe?

a. 9 cups of ginger ale and 6 cups of juice

b. 9 1/8 cups of ginger ale and 6 cups of juice

c. 9 cups of ginger ale and 8 3/4 cups of juice

d. 16 1/8 cups of ginger ale and 6 cups of juice

25. Over a 3-week period Anne used 26.33 kilowatts, 18.36 kilowatts and 23.59 kilowatts of electricity. What is the average number of kilowatts used each week?

a. 66.28 kilowatts

b. 22.76 kilowatts

c. 22.78 kilowatts

d. 18.39 kilowatts

BASIC MATH 1

POST-TEST

FORM A

TO THE STUDENT: This test is designed to assess how much of the material presented in Basic Math 1 you have learned.

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POST-TEST

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c. 9 cups of ginger ale and 8 3/4 cups of juice

d. 16 1/8 cups of ginger ale and 6 cups of juice

25. Over a 3-week period Anne used 26.33 kilowatts, 18.36 kilowatts and 23.59 kilowatts of electricity. What is the average number of kilowatts used each week?

a. 66.28 kilowatts

b. 22.76 kilowatts

c. 22.78 kilowatts

d. 18.39 kilowatts